



The Next Generation of SCORM: Innovation for the Global Force

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Advanced Distributed Learning



Background

- **The Sharable Content Object Reference Model (SCORM) is the de-facto global learning standard**
- **SCORM is widely used in academia, industry, and government to create reusable, interoperable content**
- **More than 330 certified SCORM products**
- **Focuses on a single learner in a web-based training system**
- **Reports to a traditional Learning Management System (LMS)**

Requirements Process

- **We began gathering requirements for a new API to**
 - **Cover gaps in SCORM and**
 - **Enable new technological use cases**
- **“Project Tin Can” Broad Agency Announcement (BAA)**
 - **Interviewed eLearning community members**
 - **Reviewed of LETSI whitepapers (100+)**
 - **Crowdsourced feature requests (uservoice.com)**
 - **Prioritized and compiled use cases**
- **Defense ADL Working Group (DADL WG) feedback**

Top Requirements

- **Support out-of-browser learning activities with non-proprietary solutions (different content types)**
- **Enable offline, disconnected or intermittent connections**
- **Support distributed content and systems**
- **Connect value-added services for learning analytics to storage systems**
- **Define how stored data is retrieved in a consistent manner**
- **Update the communication mechanism**
- **Support social learning scenarios**
- **Make it simple!**



**Do we need a learning specification that
expands on the capabilities of SCORM?**

The Next Generation of SCORM

- **The “Training and Learning Architecture” (TLA)**
- **Leverages cloud computing and service-oriented architecture**
- **Modern software communication with learning systems via web services**
- **Tracks formal and informal learning scenarios**
- **Supports mobile devices, games, simulations, virtual worlds, and real-world experiences**

Goals for the TLA

- **Support the Global Force**
- **Leverage mobile devices, virtual worlds, simulations, and games**
- **Capture lifelong learning**
- **Enable a truly distributed learning environment**
- **Allow sharing of learning data across systems**
- **Deliver relevant content using Semantic Web technologies**

How will we start to meet these goals for our stakeholders?

Government, Industry and Academia

Social Learning

- **Social networks are online communities of shared interest (ex. Twitter)**
- **Learners develop a trusted “Personal Learning Network” via social media interactions**
- **Enables learners to look for knowledge outside their personal experience**
- **Learners can connect to experts, peers, and mentors for knowledge**
- **Traditional LMSs don’t track and record these social learning activities**

Activity Streams

- The major social media companies developed the Activity Streams specification to capture social learning activities
- Format: “I Did This” - <actor> <verb> <object>
 - Activity Stream examples:
 - Jason *authored* I/ITSEC Paper
 - Jonathan *mentored* Jason
 - Andy *completed* CPR 101
 - Nikolaus *attended* I/ITSEC 2012
- Social networks provide “streams” of data
- Research shows Twitter streams being used effectively as an educational tool
- Instructors gain credibility from students when posting social or scholarly information

Semantic Web

- **Activity Streams can be thought of as a triple**
 - Ex. “Mark Twain wrote Huckleberry Finn”
 - Allows questions like “What other works did Mark Twain write?”
- **Enable systems to infer information through the defined semantic relationships**
 - Ex. recipes have prep time, calories, and ingredients
 - Ex. bank search gives phone #, directions, and a map
- **Many available options to add rich semantic data to content**
 - schema.org, microformats, microdata, Open Graph, META Tags
- **GOAL: Systems can make meaning from the learner’s context to deliver relevant, related content through semantic analysis**

Looking to industry to set an example for Activity Streams

Activity Streams Industry Support

- **Google+, Twitter, Instagram**
 - Ex. Nikolaus *liked* a photo
 - Ex. Jason *commented* on a photo
- **Massively Multiplayer Online Games (MMOGs)**
 - Ex. Andy *found* 86 Gold Coins
- **Facebook “Open Graph” platform**
 - Ex. Jonathan *read* the Odyssey
- **ADL is representing the learning and training community**



How do we track such diverse data?

Experience API Features (“Tin Can API”)

- **Comprises the first component of the TLA**
- **Stores all data in a Learning Record Store (LRS)**
- **Features an updated runtime communication method**
- **Allows reporting of Activity Streams from virtual, online, or real world activities**
- **Enables communication with out-of-browser content**
- **Allows flexible reporting and new data collection capabilities with a fully extensible architecture**

Short Term Research Objectives

- **Complete Experience API Specification v1.0**
 - Drive spec changes and features from community
 - Develop open source prototypes
 - Allow early adopters in commercial space to build support into their products
 - Move version 1.0 to standards body
- **Support mobile learning!**
 - Solve immediate needs of community to track mobile learning
 - Support both web and native mobile applications
 - Build reusable libraries
 - Prototype with the Services

Long Term Objectives

- **Define domain-specific extensions for communities of practice**
 - Ex. Medical, DoD, K-12 and Higher Education
- **Support team-based learning, informal learning, and social learning**
- **Enable tools for roles other than learners**
 - Ex. instructors, mentors, aides
- **Let community build apps on top of the API**
 - Ex. City of San Francisco public transportation

Future Research Areas

- **Learner profile technologies**
- **Just-in-time content brokering**
- **Intelligent tutoring**
- **Cognitive adaptability**
- **Improvement of retention**
- **Experiential learning**
- **Big data analytics**
- **Open independent learner models**
- **Semantic determination**
- **Application of virtual environments**
- **Social problem solving**
- **Self-directed learning**

Questions?

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